DOCUMENT RESUME

ED 279 364 JC 870 112

AUTHOR Smith, Lori
TITLE Pathophysiology 220.
PUB DATE 8 Mar 87
NOTE 68p.; Graduate seminar paper, University of California, Los Angeles.
PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052) -- Guides - Classroom Use - Materials (For Learner) (051)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Course Content; Course Descriptions; Course Evaluation; *Course Objectives; Course Organization; Diseases; Higher Education; Nurses; *Nursing Education; *Pathology; *Physiology; Theories

ABSTRACT

A description is provided of a course, "Pathophysiology 220," designed to provide junior nursing students at the University of Michigan's School of Nursing with theoretical knowledge of a broad range of pathophysiological conditions. Section I discusses the place of the course in the curriculum, the allotment of class time, course requirements, and the target student population. After section II provides a glossary of terms relevant to the course, section III discusses course content in terms of major course goals, long-range objectives, and units of instruction, and section IV lists instructional materials for the course. Section V describes the organization of each of the following units: (1) Alterations in Cell Structure and Function; (2) Alterations in Oxygenation of Tissues; (3) Alterations in Composition and Regulation of Body Fluids; (4) Alterations in Geniturinary Function; (5) Alterations in Endocrine Function, Metabolism and Nutrition; and (6) Alteration in Neuromuscular Function. Descriptive information, major concepts, goals and specific objectives, planned activities, assessment criteria and sample test items are presented for each unit. The final sections cover evaluation, including grading information and procedures for revising the course; estimates of the number of students expected to achieve the objectives; and references. (LAL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED279364

Pathophysiology 220

School of Nursing

University of Michigan

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☒ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
L. Smith

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

IC 870 112

Lori Smith, R.N. B.S.N.

March 8, 1987

SUBMITTED FOR EDUCATION 431B
Graduate School of Education
University of California, Los Angeles

BEST COPY AVAILABLE

Table of Contents

I.	Course Description	Page 1
II.	Glossary	Page 2
III.	Course Content	Page 4
IV.	Materials of Instruction	Page 9
V.	Organization of Each Unit of Instruction	Page 11
VI.	Evaluation	Page 26
VII.	Reference	Page 30

Selected Paper Topics

Physiological aspects of hypertension

Myocardial ischemia

Atherosclerosis

Cell-mediated immunity

Disseminated Intravascular Clotting

Cardiogenic Shock

Cardiomyopathy

Endocarditis

Pulmonary Edema

Polycythemia

Glomerulohephritis

Stevens-Johnson Syndrome

Diabetic Ketoacidosis

Encephalitis

Course Description

Curricular Placement

University of Michigan's School of Nursing's undergraduate program requires one semester of pathophysiology. The course is the duration of one semester of 14 weeks. Each student must pass this course with a minimum grade of C- during the second semester of their junior year. This course is designed to provide junior nursing students with the theoretical knowledge of a broad range of pathophysiological conditions to prepare them for their clinical placement the following year.

Time Assignment

Lecture: Four hours a week.

Tuesday and Thursday from 9-11 will be lecture

Course Requirements

Midterm and Final Exam each two hours, closed-book, in class.

Final exam non-comprehensive.

Five page term paper, selected topics on preceding page.

Midterm, final and paper worth 35% of grade.

Description of Student Population

Nursing 220 is a required course for junior nursing students prior to their advanced medical-surgical clinical placement. The undergraduate division of the School of Nursing offers the degree of B.S.N. All students enrolled in N-220 must be in the baccalaureate nursing program. Students must have met the admission requirements of the University of Michigan's School of

Nursing. Transfer students into the School of Nursing may enroll in the class if at junior standing and with their advisor's permission.

It is assumed the students will be at the same proficiency level in general due to the sequencing of courses prior to N-220. N-220 is the sequelae to physiology. Its designed to relate aberrant conditions with previously learned knowledge, of general physiology the first semester junior year.
It is estimated that of the 90 students enrolled in the course, all students will pass through meeting the specified goals and objectives. And, the attrition rate will be zero because of the placement of this course in the second semester junior year (the third of a four year program). It is the expectation that following this course all of the nursing students will continue in the program and graduate the next academic year.

Glossary

Accountability:	To take responsibility for; answerable.
Acquire:	To gain by one's exertion. Attain, learn or obtain.
Analyze:	To separate a certain concept into basic principles or parts, of which it is composed, for examination.
Apply:	Relate sets of data to formulae or principles in a manner to approach accurate solutions.
Collaborate:	To work or act jointly.
Compare:	To examine the character or qualities of, for the purpose of discovering their similarities

	or differences.
Define:	To describe, expound, or explain.
Demonstrate:	To make clear by evidence or reasoning. To explain or illustrate.
Describe:	To relate, recount narrate, express, explain, depict, picture, delineate, or characterize.
Discriminate:	To separate by discerning differences.
Distinguish:	To recognize or discriminate one thing from among others, to make distinctions.
Explain:	To make plain or intelligble, or clear.
Identify:	To ascertain the origin, nature, or characteristics of a concept.
Individualize:	To make specific to an individual; particularize.
Interpret:	To clarify the meaning; elucidate.
Physiology:	The science of the functions of the living organism and its components and the chemical and physical processes involved.
Pathophysiology:	Study of the nature and cause of abnormal physiology.
Recognize:	To perceive clearly.
Relate:	To bring into natural or logical association.
Select:	To choose the correct choice from a list of choices.
Specify:	To state clearly.
State:	To verbalize in words.
Understand:	Comprehend, translate, explain in simple terms.

Utilize: To make useful.

Course Contents

This course is designed for the junior nursing student to acquire knowledge in pathophysiology. This knowledge is necessary to base clinical judgements on in the clinical component beginning senior year, and future nursing practice. The sequence of this course is designed to enable the matriculant to build on acquired knowledge from physiology the term prior to pathophysiology. The rationale for this is to move from the normal condition to the aberrant. This is in keeping with the philosophy of the University of Michigan's School of Nursing.

The philosophy of the School of Nursing is the belief that it is the right of all individuals to receive optimal health care. Nursing shares with other health care professionals the goal of promoting health for individuals and communities, as well as the responsibility for the care, comfort, and dignity of patients in the health-illness continuum. To accomplish this goal, nurses function as independent practitioners, in collaboration with other members of the health team. Based on scientific knowledge and technical skill, the practice of nursing focuses on the promotion of health, prevention of illness, and support of the patient. Nursing concerns include expansion of knowledge essential to the nursing process, new methods of care, and improvement of health care delivery systems.

In implementing the philosophy of nursing, the curriculum

concentrates on the behavior of people as they progress through various stages of the health-illness continuum. The programs provide for an understanding of the social and cultural systems in which living and care-giving occur as well as a knowledge base of psychology and physiology under normal and pathological conditions.

Major Course Goals

Upon completion of Pathophysiology, N-220, the student will be able to:

1. Acquire knowledge from this scientific domain and relate this knowledge into an understanding of those processes which underlie the patients disease process.
2. Develop accountability in nursing performance and generate independent nursing diagnoses based on pathophysiological conditions.
3. Collaborate with other health care professionals, agencies and the public based on a scientific foundation.
4. Individualize patient assessments, provide comprehensive care based on knowledge of pathophysiology.

These goals relate to the School of Nursing's goal in providing the student with a comprehensive knowledge base in pathophysiology as well as specifying that upon completion of the Bachelor of Science in Nursing program, the graduate:

1. Selects and applies appropriate theory and research findings (concerning the health-illness continuum,

cultural diversity, and psychophysical environment) to the nursing process with a variety of client situations:

2. Utilizes the nursing process to promote health, prevent illness, and support the resources of the clients;
3. Identifies researchable problems and evaluates completed research on nursing problems;
4. Participates in professional and community organizations and/or interest groups relevant to nursing and modifies nursing standards and practices in keeping with current trends;

In addition, this course meets the National League of Nursing's requirements for a course in pathophysiology. It is the expectation of the Department that 100% of the graduates will enter the profession of nursing one year following the course.

Long-Range Objectives

These four long-range objectives are hypotheses by which the instructor may assess the effects of the course. The percentage figures may represent expectations which have been derived from the experience with the course and the University of Michigan School of Nursing.

1. Upon visiting the students within one year of completing the program 100% will have passed the State Boards. This is measured by the students possession of their nursing license.
2. On being visited within five years after the course 50%

will have completed or be currently enrolled in graduate nursing school. This will be verified by viewing their diploma or by a transcript from a current enrollment.

3. Of the students who complete the Bachelor of Science nursing program, 80% will be able to explain the rationale for studying pathophysiology as an essential prequisite for nursing practice.
4. Of the students who enter nursing practice 30% will have participated in research using knowledge acquired in pathophysiology, and submitted a manuscript for publication within 5 years of completing the course. This will be verified by the presentation of a published research document which includes pathophysiology.
5. Of the students who successfully complete an undergraduate program leading to the Bachelor of Science degree in Nursing, and have chosen to teach nursing, 60% will incorporate pathophysiology into their teaching program.

Units of Instruction

Unit One: Alterations in cell structure and function.
Eight classes, sixteen lecture hours.

Unit Two: Alterations in oxygenation of tissues.
Six classes, twelve lecture hours.

Unit Three: Alterations in composition and regulation of body fluids.
Two classes, four lecture hours.

Unit Four: Alterations in genituriary function.
One class, two lecture hours.

Unit Five: Alterations in endocrine function, metabolism, and nutrition.
Five classes, ten lecture hours.

Unit Six: Alteration in neuromuscular function:
Three classes, six lecture hours.

Class Schedule

Session One: Introduction: Course Expectations

Session Two: Cell and tissue characteristics, cell injury

Session Three: Inflammation and the inflammatory response

Session Four: Immunodeficiency, transplant rejection

Session Five: AIDS

Session Six: Systemic Lupus Erythematus, rheumatoid arthritis

Session Seven: Genetic Counseling, Down's syndrome

Session Eight: Neoplasia, properties of benign and malignant tumors

Session Nine: Cancer effects and treatment

Session Ten: Peripheral vascular disease, aneurysms

Session Eleven: Abnormal blood clotting, bleeding disorders

Session Twelve: Hypertension, hypotension

Session Thirteen: Shock

Session Fourteen: Midterm 2 hours closed book (35% of grade)
Midterm instructor evaluation.

Session Fifteen: Cardiac arrhythmias, myocardial infarction

Session Sixteen: Pneumonia, Adult Respiratory Distress

	Syndrome
Session Seventeen:	Acid-base balance, Arterial blood gases
Session Eighteen:	Burns and their prevention
Session Nineteen:	Acute and chronic renal failure
Session Twenty:	Thyroid disorders
Session Twenty-one:	Diabetes Mellitus
Session Twenty-two:	Peptic and duodenal ulcers
Session Twenty-three:	Pancreatitis, cancer of the pancreas
Session Twenty-four:	Hepatitis A, B non-A- non-B. Paper due.
Session Twenty-five:	Mechanisms of pain, autonomic nervous system
Session Twenty-six:	Meningitis, seizures, cerebral circulation
Session Twenty-seven:	Spinal cord injury, head injury
Session Twenty-eight:	Final exam,two hour, in class, closed book 35% of grade,course evaluation

This schedule is based on a fourteen week semester. Class lectures are two hours twice a week, Tuesday and Thursday 9-11am.

Materials of Instruction

Required text

Students enrolled in Pathophysiology 220 will be required to purchase the following text. It is available at the University bookstore and three copies are on reserve at the biomedical library. All assigned readings are from this text.

Porth, C. Pathophysiology: Concepts of Altered Health States.

Philadelphia: J.B. Lippincott Company,1982.

Suggested references

The following books are on reserve in the Biomedical library for supplemental use in 220:

1. Groer, M. Shekleton, M. Basic Pathophyiology: A Conceptual Approach.
2. Ross, G. Essentials of Human Physiology. Chicago: Year Book Medical Publishers, Inc., 1982.
3. Selkurt, E.E., Physiology. Boston: Little, Brown and Co., 1984.
4. Vander, A.J., Sherman, J.H., and Luciano,D.S., Human Physiology. New York: McGraw-Hill, 1985.

Audio-visual materials are an excellent adjunct to teaching and will be used frequently in this course. They include:

1. Overheads with lectures.
2. Three films, 1. "Cancer, its effects and treatments"
   2. "The patient living with acute myocardial infarction"
   3. "Living with diabetes"
3. Class handouts, such as the prevention pamphlets on burns included in the Appendix. As well as the article on cardiomyopathy and booklet on cancer treatments and effects, included in Appendix.
4. Students are required to view the following slide tapes in the School of Nursing media center:
   a. Nursing care of the burned patient.
   b. Pathophysiology of aneurysms.

c. Basic cardiac arrhythmias and their recognition.

d. Viral pneumonia and its effects.

e. Nursing implications for patients in acute and chronic renal failure.

f. The function of endorphins and prostaglandins in endocrine regulation.

g. Nursing implications for the care of the head injured patient.

Organization of Instruction

Unit One: Alteration in cell structure and function.

The cell is the basic functional unit of the body. Cells, in turn, are organized into larger functional units called tissue. It is tissue that forms body structures and organs. To understand the function of the body, its various organs, and alterations in function that occur with disease, it is necessary to understand the basic organization and function of the individual cells and the characteristics of the various tissue types. This unit further addresses cellular responses to stress, injury, and death, the inflammatory response, a discussion of the role of immunity as related to the production of disease and selected neoplasms of the immune cells or related structures.

Major Concepts, Goals

After completion of Unit I, the student will be able to:

1. Describe the basic components of the cell and their function.
2. Describe the inflammatory response.

3. Discuss the mechanisms underlying transplant rejection.
4. Describe the characteristics of rheumatoid arthritis, SLE, and AIDS.
5. Understand the importance of genetic counseling to high-risk patients.

Specific Objectives

1. After completing the assigned readings about cell structure and function, the student will be able to define the following organelles: nucleus, ribosomes, mitochondria, endoplasmic reticulum, Golgi body and cytoplasm and label these organelles on a diagram with 80% accuracy. This will take place on the midterm closed-book exam given in the seventh week of the course in class.
2. After completing the assigned readings and attending lecture on cell differentiation, the student will be able to state the four classifications of tissue types when asked in class with 100% accuracy.
3. After completing the assigned readings and attending lecture on cell injury and death, the student will be able to describe the manifestations of reversible cell injury with 80% accuracy on the closed-book midterm.
4. After attending lecture on the inflammatory response, the student will be able to state the three patterns of response that occur with an inflammatory response with 90% accuracy on the closed-book midterm.
5. After completing the assigned readings and attending lecture, the student will be able to differentiate among active, passive, and natural immunity on the

closed-book midterm with 80% accuracy.

Planned Activities

Lectures: Eight classes, sixteen lecture hours.

Lecture 1: Cell and tissue characteristics, cell injury.

Lecture 2: Inflammation and the inflammatory response.

Lecture 3: Immunodeficiency, transplant rejection.

Lecture 4: AIDS

Lecture 5: Systemic Lupus Erythematus, rheumatoid arthritis

Lecture 6: Genetic Counseling, Down's syndrome.

Lecture 7: Neoplasia, properties of benign and malignant tumors.

Lecture 8: Cancer effects and treatments. Film, "Cancer, its effects and treatments"

Student assignment: Porth, Chapters 1,2,3,4,5,6,7,8,9,&10.

Assessment

Students will be expected to answer, in detail, in the form of short answer questions, one matching question, and a labelling question, the objectives stated at the beginning of the unit. This material will be on the closed-book midterm.

Sample Test Items

1. See Appendix for diagram to be labelled.
2. Briefly describe the manifestations of reversible cell injury in 50 words or less.
3. Match the statement with the correct type of immunity.

A. Body has acquired the ability to defend itself against a specific agent.	1. Passive immunity 2. Active immunity 3. Natural immunity

B. Species specific. Prevents humans from contracting animal diseases.

C. Temporary immunity burrowed from another source.

4. List the three patterns of response that occur with an inflammatory response.

Unit Two: Alterations in oxygenation of tissues

Latest estimates indicate that over 40 million persons in the United States have cardiovascular disease. In an attempt to focus on heart problems that affect otherwise healthy persons, this unit centers on the following: control of cardiac function, coronary heart disease, rheumatic heart disease, and congestive heart failure. It includes discussions on disorders of the blood vessels, the heart, the resiratory system, and the red blood cells.

Major Concepts, Goals

Following completion of Unit II, the student will be able to:

1. Describe the factors that regulate blood flow.
2. Describe the physiologic regulation of blood flow on the basis of its local, neural, and humoral components.
3. Describe the pathogenesis of peripheral vascular disease.
4. Describe the physiologic basis of acute disseminated intravascular clotting.
5. Distinguish between the categories of shock.

Specific Objectives

1. After attending class lectures and completing assigned readings about peripheral vascular disease, the student

will be able to state the factors that regulate blood flow in class when asked with 100% accuracy.

2. After attending class lectures and completing assinments including, viewing the slide tape "Pathophysiology of aneurysms" the student will be able to describe three common types of aneurysms with 80% accuracy on the closed-book midterm exam.
3. Given a list of 20 characteristics of the four main types of shock the student will be able to match the characteristics with the type of shock with 80% accuracy on the closed-book midterm.

Planned Activities

Lectures: Six classes, twelve lecture hours.

Lecture 1: Peripheral vascular disease, aneurysms

Lecture 2: Abnormal blood clotting, bleeding disorders, disseminated intravascular clotting

Lecture 3: Hypertension, hypotension

Lecture 4: Shock

Lecture 5: Cardiac arrhythmias, myocardial infarction. Film, "The patient with acute myocardial infarction."

Lecture 6: Pneumonia, Adult Respiratory Distress Syndrome

Student assignment:

Porth, Chapters 9,10,11,12,13,14,15,16,17,&19.

Viewing the slide tapes in the Media Center on:

1. Pathophysiology of aneurysms.
2. Basic cardiac arrhythmias and their recognition.
3. Viral pneumonia and its effects.

Assessment

Students will be required to answer thoroughly, in the form of short answer and matching questions on the closed-book midterm, the objectives stated at the beginning of the unit.

Sample Test Items

1. Describe the three most common type of aneurysms and differentiate their specific characteristics in 50 words or less.
2. Match the following twenty characteristics with the correct type of shock:

A. Low cardiac output	1. Cardiogenic Shock
B. High cardiac output	2. Septic Shock
C. Loss of volume	3. Hypovolemic Shock
D. Loss of whole blood	4. Neurogenic Shock
E. Vasodilation	
F. Arteriovenous shunting	
G. Failure of the heart as a pump	
H. Gram negative bacteria	
I. Skin is flushed and warm	
J. Associated with brain injury	
K. Bradycardia	
L. Decreased sympathetic control of blood vessels	
M. Loss of blood vessel tone	
N. Severe alterations in cardiac rhythm	
O. Obstruction to outflow of blood	

etc. up to 20 items

Unit Three: Alterations in composition and regulation of body fluids.

Fluids are essential components of a biologic system. Body fluids vary in amount and composition, according to their location and purpose. Although water is the major component of body fluids, the fluids also contain dissolved gases, electrolytes, nutrients, plasma proteins, and metabolic wasters. The content of this unit includes: alterations in body fluids and electrolytes, acid-base disorders, and alterations in the distribution of body fluids.

Major Concepts, Goals

Following completion of Unit III, the student will be able to:

1. Describe the clinical manifestation of hypernatremia and hyperkalemia.
2. Describe the relationship between hyperphosphatemia and serum calcium.
3. Recognize the signs and symptoms of respiratory alkalosis, respiratory acidosis, metabolic alkalosis, and metabolic acidosis.
4. Understand normal arterial blood gas values.
5. Recognize the effects of a burn injury and understand common means of prevention.

Specific Objectives

1. After completing the assigned readings and attending lectures, the student will be able to list 5 symptoms of hypernatremia and hyperkalemia on the closed-book final exam with 80% accuracy.
2. After the lecture on acid-base balance, the student will

be able to describe in 40 words or less the relationship between hyperphosphatemia and serum calcium on the closed-book final exam with 80% accuracy.

3. After viewing the slide tape "Nursing care of the burned patient" and attending lecture, the student will be able to identify four nursing roles and the rationale for these in 50 words or less on the final exam with 80% accuracy.
4. Upon completion of this unit the student will be able to match ten symptoms of metabolic acidosis, metabolic alkalosis, respiratory acidosis, and metabolic alkalosis on the final exam with 80% accuracy.

Planned Activities

Lecture: Two classes, four lecture hours

Lecture 1: Acid-base balance, Arterial blood gases

Lecture 2: Burns and their prevention

Student Assignment:

Porth, Chapters 21,22,23,& 24.

Slide Tape: Nursing care of the burned patient.

Assessment

Students will be required to answer in the form of short essay and matching items, the objectives stated at the beginning of the unit on the closed-book final exam in class.

Sample Test Items

1. Describe four nursing roles used when caring for the burned patient and rationale for their use in 50 words or less.
2. Match the ten symptoms listed below with the corresponding acid-base condition:

A. Hypoventilation
B. Hyperventilation
C. Gastric Suctioning
D. Vomiting
E. Ingestion of bicarbonate
F. Diuretic therapy
G. Increased potassium losses
H. Loss of chloride ion
I. Head injury
J. Paralysis of respiratory muscles

1. Metabolic acidosis
2. Respiratory alkalosis
3. Metabolic alkalosis
4. Respiratory acidosis

3. List five symptoms of hypernatremia and hyperkalemia.

Unit Four: Alterations in Genitourinary Function

The urinary system provides the means for elimination of metabolic wastes and the regulation of the composition of body fluids. The focus of this unit is on alterations of renal functions, which thereby alter elimination of wastes and body fluid balance, specifically acute and chronic renal failure.

Major Concepts, Goals

Following completion of Unit IV, the student will be able to:

1. Describe the differences between acute and chronic renal failure.
2. Understand the manifestations of renal failure as it applies to four major body systems.

Specific Objectives

1. Following lecture, reading the text, and viewing the required slide tape, the student will be able to list the five major symptoms of acute and chronic renal failure on a

closed-book final in class, with an accuracy of 80%

2. In 40 words or less the student will describe the manifestations of renal failure as they apply to four or more major body systems, on the closed-book, in-class final with an accuracy of at least 80%.

Planned activities

Lectures: One class, two lecture hours.

Lecture 1: Acute and chronic renal failure.

Student Assignment:

Porth, Chapters 25,26,& 27.

Slide tape: Nursing implications for patients in acute and chronic renal failure.

Assessment

Students will be expected to answer thoroughly, the objectives stated above on the final exam.

Sample Test Items

1. List the five major symptoms of acute and chronic renal failure.
2. Discuss in 40 words or less the manifestations of renal failure as they apply to four or more major body systems.

Unit Five: Alterations in Endocrine Function, Metabolism, and Nutrition.

Body function is dependent upon energy from metabolism of carbohydrates, proteins, and fats that are derived from foodstuffs consumed in the daily diet. It is the gastrointestinal tract in concert with the endocrine system that regulates the supply and utilization of metabolic fuels. The

gastrointestinal tract provides the means whereby nutrients, vitamins, and minerals needed for growth, cell replacement, and body metabolism gain access to the confines of the body's internal environment. Within these confines, the endocrine system acts in regulating metabolism and is involved in all of the other integrative aspects of life. This unit focuses on: control and alterations in function of the endocrine system, control of metabolism and diabetes, and alterations in gastrointestinal, hepatobiliary, and pancreatic function.

Major Concepts, Goals

Following completion of Unit V, the student will be able to:

1. Describe the function of endorphins and prostaglandins.
2. Describe the mechanisms of hormone-receptor interactions.
3. Describe the manifestations of hypothyroidism and hyperthyrodism.
4. Recognize signs and symptoms of hyperglycemia and hypoglycemia.
5. Understand the actions of insulin, and glucagon.
6. Distinguish between gastric ulcer and peptic ulcer.
7. Describe the distinguishing features of hepatitis A, hepatitis B and non-A -non-B.
8. Describe the clinical manifestations of acute pancreatitis.

Specific objectives

1. Following completion of assigned readings and attendance at class lectures about thyroid disorders, the student will be able to explain the manifestations of hypothyroidism and hyperthyroidism in 40 words or less on a closed-book final exam in class, with 80% accuracy.

2. After completion of the lecture and readings on diabetes, the student will be able to match with 80% accuracy ten signs and symptoms of hyperglycemia and hypoglycemia with the correct alteration in blood sugar.
3. Upon completion of the lecture and readings pertaining to peptic and gastric ulcers, the student will be able to answer true or false to a list of ten statements relating to each condition with an accuracy of 80% on the closed-book in class final exam.
4. Following completion of the lecture and readings on hepatitis and its effects the student will be able to list two distinguishing features of the three main forms of hepatitis on the closed-book, in class final exam with 80% accuracy.

Planned Activities

Lectures: Five classes, ten lecture hours.

Lecture 1: Thyroid disorders

Lecture 2: Diabetes Mellitus. Film, "Living with diabetes."

Lecture 3: Peptic and gastric ulcers

Lecture 4: Pancreatitis, cancer of the pancreas

Lecture 5: Hepatitis A, B, non-A-non-B

Student Assignment:

Porth, Chapters 32,33,34,35,36,37,& 38.

Slide tape: The function of endorphins and prostaglandins in endocrine regulation.

Assessment

Students will be expected to answer, the short answer

questions in the above stated objectives on the final exam. In addition the student will be expected to complete the matching and true, false questions on the final exam.

Sample Test Items

1. Match the following ten signs and symptoms of hyperglycemia or hypoglycemia with its specific alteration in blood sugar.

A. Hunger	1. Hyperglycemia
B. Nausea	2. Hypoglycemia
C. Tachycardia	
D. Kussmaul breathing	
E. Acute weight loss	
F. Slurred speech	
G. Sweating	
H. Headache	
I. Dry skin and mucous membranes	
J. Odor of ketones on breath	

2. List true or false next to the following ten statements.
   A. Gastric ulcers are more common than peptic ulcers.
   B. A peptic ulcer may occur in the esophagus.
   C. Decreased tissue resistance plays a greater role in the development of peptic ulcers.
   D. The pain of a peptic ulcer is generally relieved by food.
   E. 50% of persons with a chronic gastritis develop peptic ulcers.
   F. A peptic ulcer represents a break in the continuity of the mucosal layer.
   G. Food as an antacid is recommended to manage gastric

ulcers.

H. Gastric ulcers can occur in the absence of hydrochloric acid.

I. Ischemia or decreased blood flow may predispose a person to an ulcer.

J. Persons with the blood type O have a higher than average incidence of duodenal ulcers.

Unit Six: Alteration in Neuromuscular Function:

The nervous system in coordination with the endocrine system provides the means for all ot the integrative aspects of life. It controls not only skeletal muscle movement, but the activity of cardiac and visceral smooth muscle as well. The nervous system makes possible the reception, integration and perception of sensory information. No part of the nervous system functions separately from other parts, and in the human, the effects of emotion can exert a strong influence on both neural and hormonal control of body function. Since the nervous system is subject to many disorders, which are too numerous to be covered in this unit the following topics will be emphasized: the autonomic nervous system, mechanisms of pain, spinal cord injury and head injury.

Major Concepts, Goals

After completion of Unit IV, the student will be able to:

1. Describe the functions of the parasympathetic and sympathetic nervous systems.
2. Describe the major theories regarding the mechanisms for pain.

3. Describe the regulation of cerebral circulation.
4. Distinguish between viral and bacterial meningitis.
5. Compare the symptoms of concussion with those of contusion.
6. State four major couses of seizure activity other than epilepsy.
7. Explain the occurrence of hypertension following spinal cord injury.

Specific Objectives

1. After completing the readings on meningitis and attending lecture, the student will be able to list five symptoms of bacterial and viral meningitis on the final exam with an accuracy of 80%.
2. After attending the lecture on head injury and viewing the slide tape on,"Nursing implications for the head injured patient", the student will be able to list five symptoms of concussion and contusion with an accuracy of at least 80% on the final exam.
3. After the lecture on seizures, the student will state four major causes of seizure activity other than epilepsy on the final exam with an accuracy of at least 80%.
4. After attending the lecture on spinal cord injury and completing the readings, the student will explain in 40 words or less why hypertension occurs following spinal cord injury with an accuracy of 80% on the final.

Planned Activities

Lecture: Three classes, six lecture hours.

Lecture 1: Mechanisms of pain, autonomic nervous system

Lecture 2: Meningitis, seizures, cerebral circulation

Lecture 3: Spinal cord injury, head injury

Student Assignment:

Porth, Chapters 40,41,42,43 & 44.

Slide tape: Nursing implications for the care of the head injured patient.

Assessment

Students will be required to answer in the form of short essay the objectives stated at the beginning of the unit on the closed-book final exam in class.

Sample Test Items

1. List five symptoms of viral and bacterial meningitis.
2. List five symptoms of concussion and contusion.
3 List four major causes of seizure activity other than epilepsy.
4. Explain in 40 words or less why hypertension occurs following spinal cord injury.

Evaluation

Grading

The student's grade will be based on the following methods of performance:

Midterm Examination 35%

Term Paper 35%

Final Examination 35% (non-comprehensive)

Each closed-book, combination objective matching, true-false, short answer, and short essay exam will be given in class over the two hour period. All students are required to

take the exams at the designated time. If the student is unable to take the exam due to illness or an emergency, the student will have the option of receiving an incomplete. At a later date the student will make arrangements to complete the exam. By making the course expectations explicit from the first day of class, the instructor expects the student will meet the requirements of the course and receive at least a grade of B-.

The following grading scale will be used:

1. 90-100% A
2. 80-89% B
3. 70-79% C
4. 60-69% D
5. 59% or below will result in an F.

This grading scale is in keeping with University guidelines.

This instructor expects at least 80% of the students to receive a grade of B- or higher in the course. Students will have ample opportunity to ask questions during class time. In addition, the instructor will have office hours on Mondays and Wednesdays from 8am. until 11am. to assist any students who may have difficulty. Midway through the semester the instructor will distribute her rating scale to ascertain feedback from the class.

Procedures for Revising the Course

At midterm if the instructor rating scale elicits negative feedback the specific problems will be addressed immediately. A review of both strengths and weaknesses at midpoint will help to improve the success of this course. The evaluation tool, will again be distributed on the final day of class, to elicit

feedback pertaining to the latter half of the course. Both times it is distributed the students will be allowed 20 minutes without the instructor present to complete the questionnaire.

Furthermore, the instructor will review exam scores, quality of term papers, and the students' mastery of the course objectives as measured by their performance on the graded components of the course.

Recommendations for revision based on the above will be discussed with the Department Chairperson at the Scool of Nursing.

Estimated number of students who will achieve the objectives

It is estimated that 100% of the students will pass Pathophysiology 220. This extremely high estimate is based on the placement in the second semester of the junior year of a four year program. In addition, the students will know exactly what course expectations are from the first day of class. They will receive the course syllabus, which includes specific objectives.

Following midterm evaluations and the examination if the class is experiencing difficulty with the material, the last unit may be dropped and the pace slowed. Tutor services will be emphasized at this time and advisors of individual students experiencing difficulty informed.

If for some reason a student does not meet the course requirements reenrollment the following year is possible. The instructor will be available to the student for guidance and the provision for tutoring at any time is through the School of Nursing. A student may enroll in the course any number of times

to meet the requirements but it is only offerred once a year.

References

McKeachie, W.J. Teaching Tips. Massachussetts: D.C. Heath and Company, 1986.

Levine, Arthur. Handbook on Undergraduate Curriculum. San Francisco: Jossey-Bass publishers, 1978.

Scales, F. Nursing curriculum: development, structure and function. Norwalk: Appleton-Century-Crofts.

APPENDIX

In order to be an effective instructor I need your feedback on this course. After each sentence please circle the number which best matches your perception of the instructor.

1=strongly agree 2=agree 3=disagree 4=strongly disagree

Thank you for your time and cooperation.

1. The instructor clearly defined course objectives.

   1 2 3 4

2. The instructor was well-organized in presenting course material.

   1 2 3 4

3. The instructor demonstrated a thorough knowledge of the subject matter.

   1 2 3 4

4. The instructor used a variety of effective classroom methods to facilitate achievement of student objectives and maintain class objectives.

   1 2 3 4

5. The instructor stimulated your interest in the subject matter.

   1 2 3 4

6. The instructor appeared sensitive to students needs and questions.

   1 2 3 4

7. The instructor provided opportunities in class for students questions and comments.

   1 2 3 4

8. The instructor kept the course to the student's level of understanding.

   1 2 3 4

9. The instructor's grading process was fair.

   1 2 3 4

10. The instructor's exams were fair in their level of difficulty.

    1 2 3 4

11. The instructor's grading on papers and exams was fair and objective.

    1 2 3 4

12. The instructor's comments on exams and papers was helpful.

    1 2 3 4

13. The instructor's course requirements were fair.

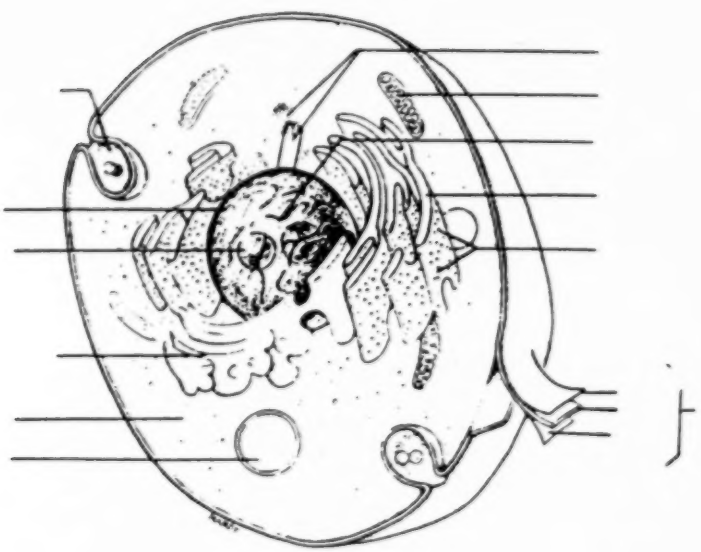
    1 2 3 4

14. The instructor has achieved the course objectives.

    1 2 3 4

LABEL ALL PARTS OF THIS DIAGRAM

Figure 2-1. A composite cell designed to show, in one cell, all of the various components of the nucleus and cytoplasm.

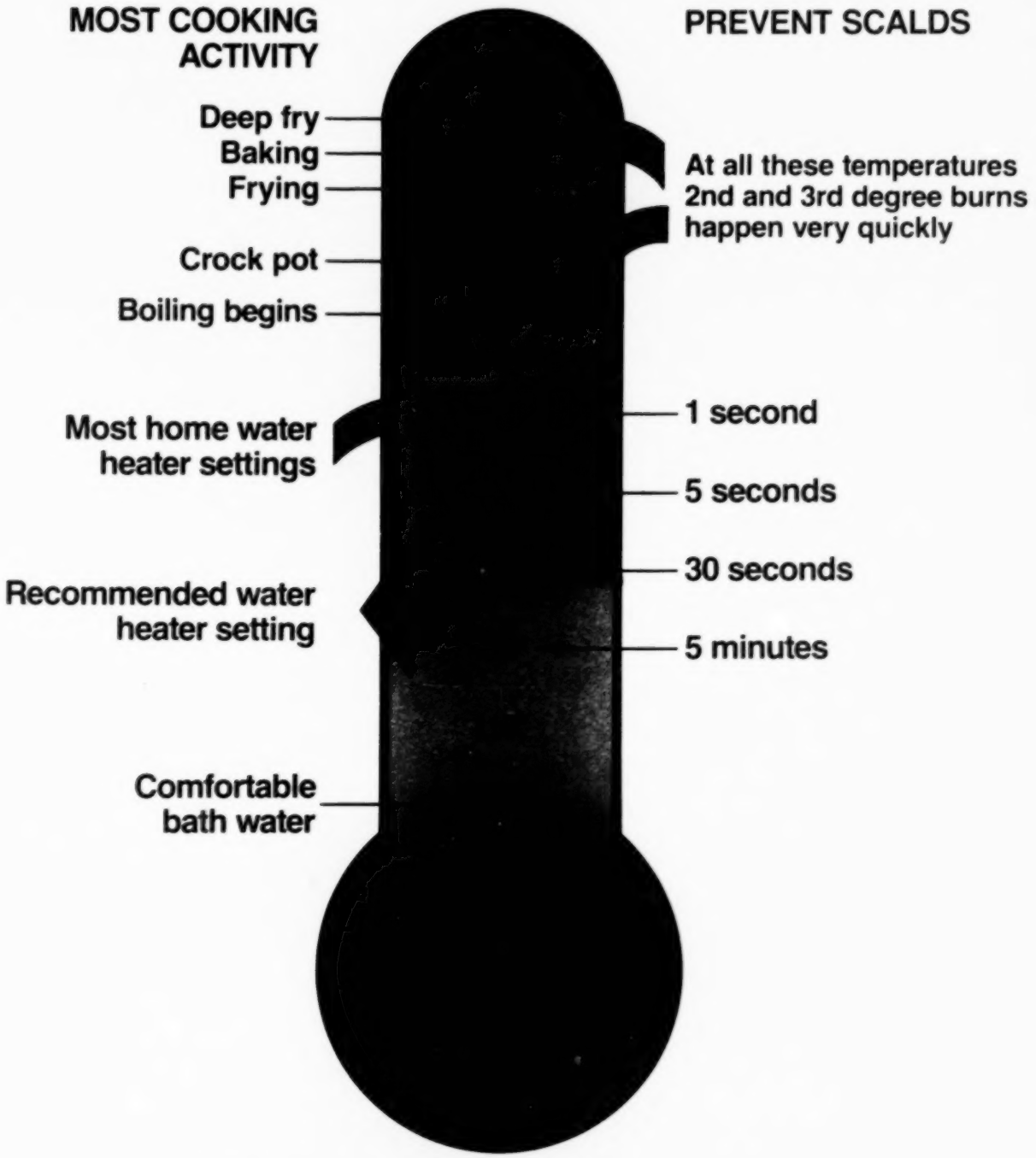


THE SOUTHERN CALIFORNIA BURN CENTER at Sherman Oaks Community Hospital

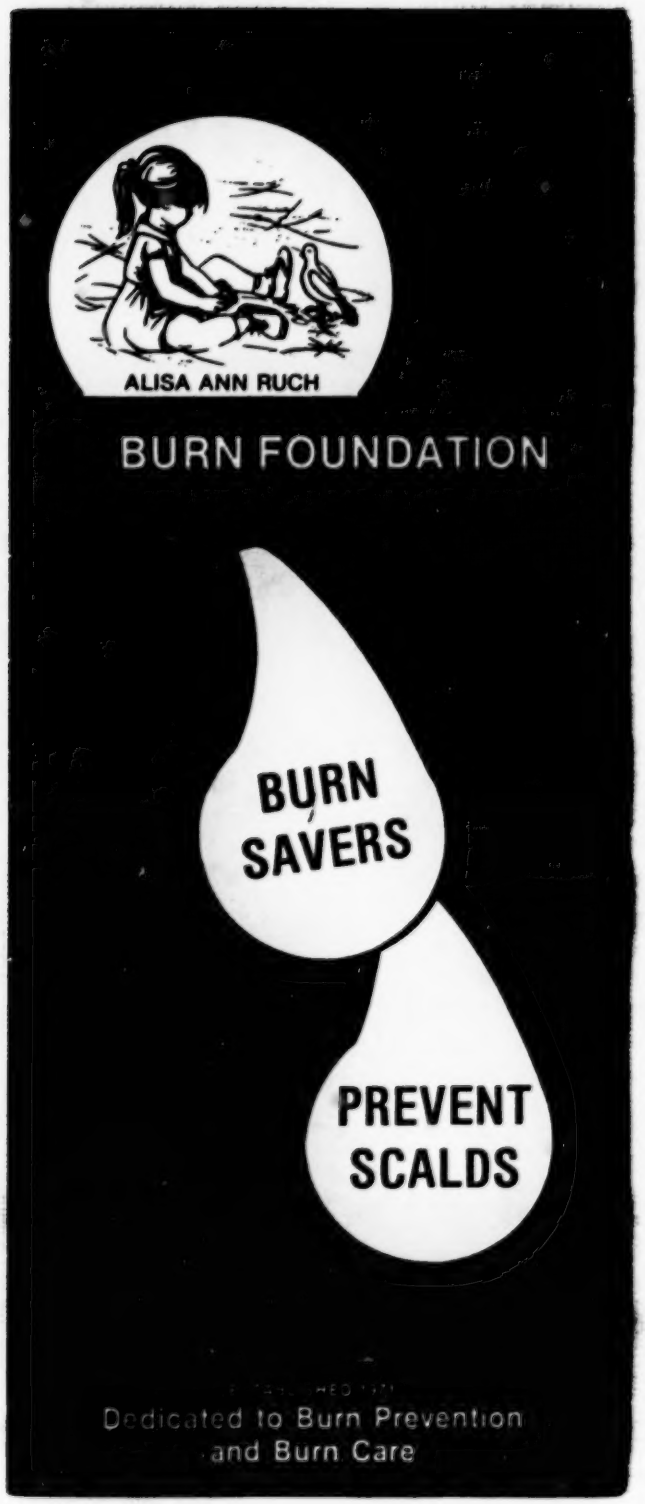
4929 Van Nuys Blvd., Sherman Oaks, California 91403

(818) 981-7111

a service of NU MED



NOTE: Microwave cooking presents special hazards. Fillings in doughnuts, pies, tarts, etc. become super heated (600° or more) and may explode when moved.


ALISA ANN RUCH
BURN FOUNDATION
BURN SAVERS
PREVENT SCALDS
Dedicated to Burn Prevention and Burn Care

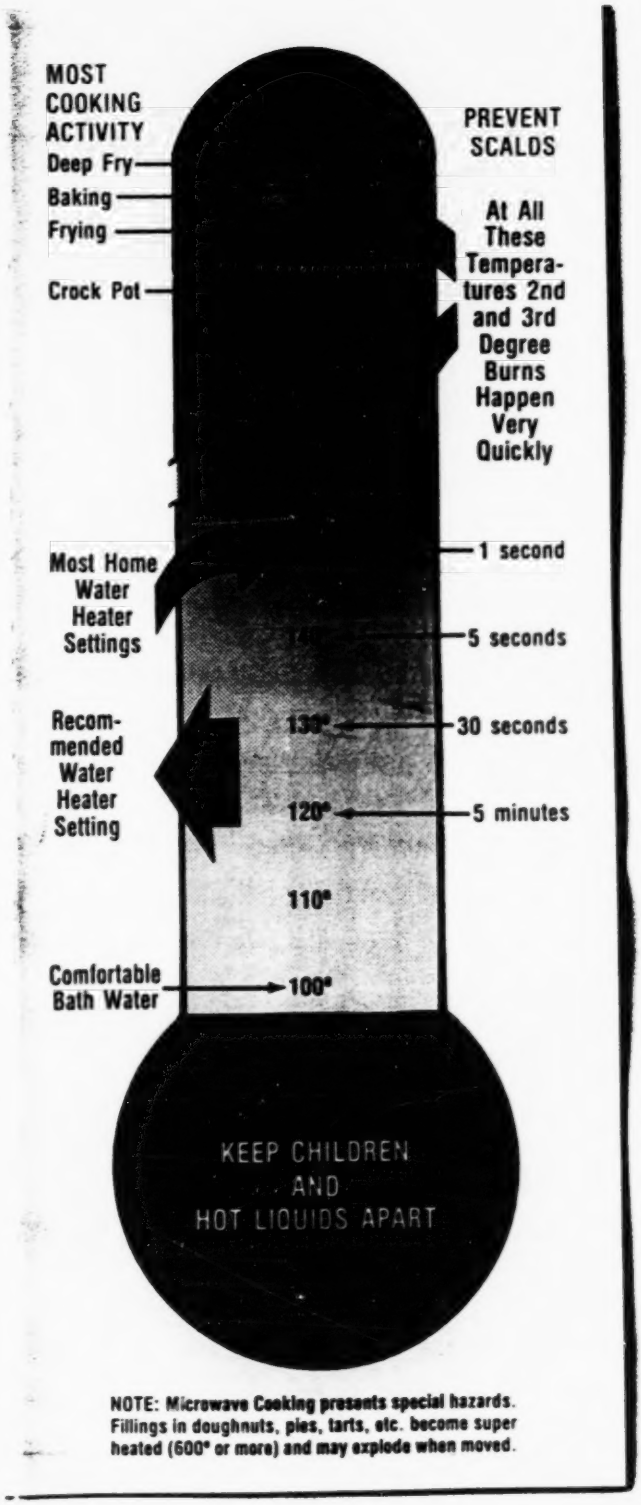
BE A BURN SAVER
PREVENT SCALDS

HOT LIQUIDS & HOT WATER ARE THE MAJOR CAUSES OF BURNS TO SMALL CHILDREN

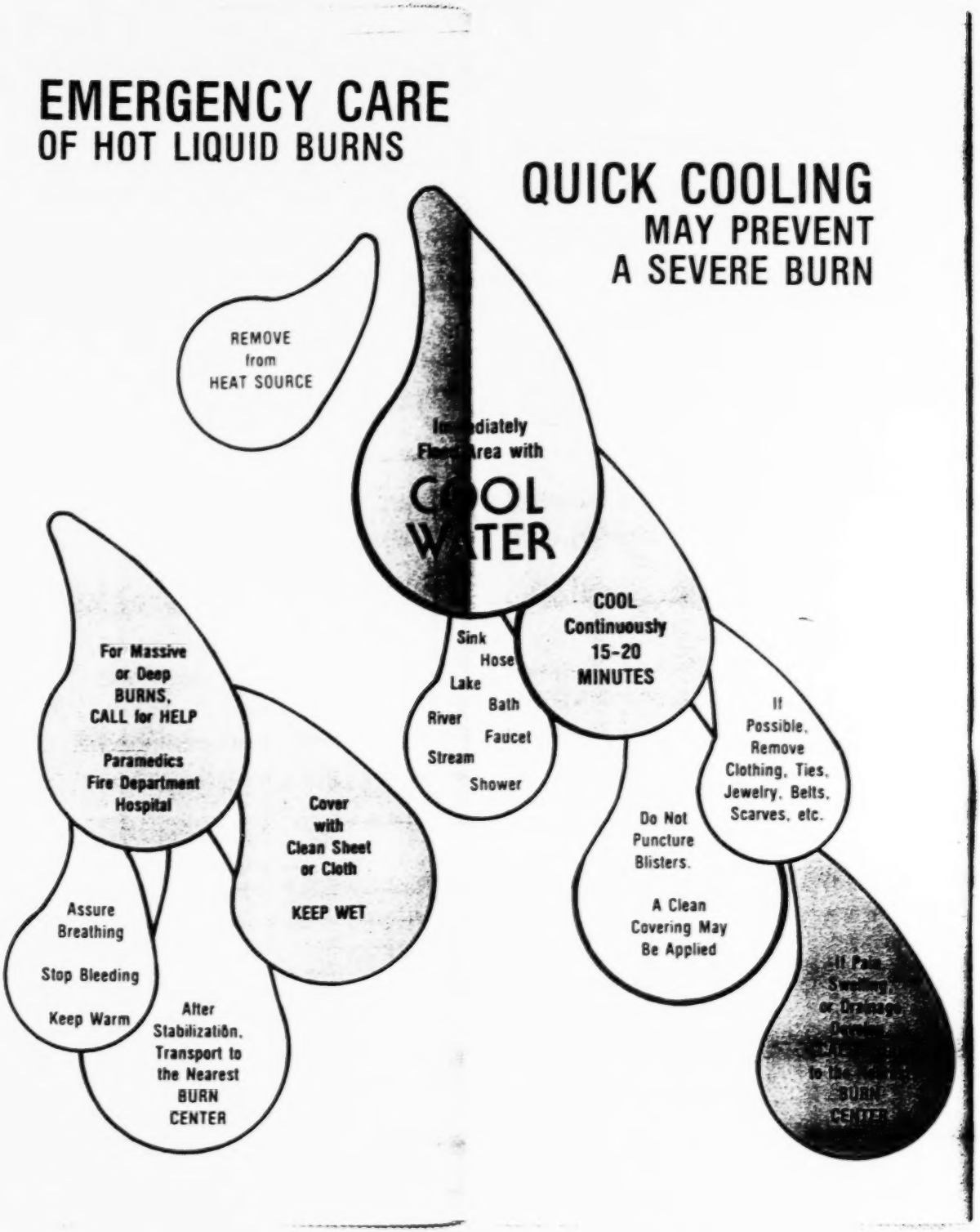
Cook on rear burners of range. Turn pot handles to rear but not over burners.

Keep electrical appliances to rear of counter. Coil or roll cords so they cannot be reached.

Watch young children in bathtub.
for small


MOST COOKING ACTIVITY
Deep Fry
Baking
Frying
Crock Pot
PREVENT SCALDS
At All These Temperatures 2nd and 3rd Degree Burns Happen Very Quickly
Most Home Water Heater Settings
Recommended Water Heater Setting
Comfortable Bath Water
1 second
5 seconds
130°
30 seconds
120°
5 minutes
110°
100°
KEEP CHILDREN AND HOT LIQUIDS APART
NOTE: Microwave Cooking presents special hazards. Fillings in doughnuts, pies, tarts, etc. become super heated (600° or more) and may explode when moved.

EMERGENCY CARE
OF HOT LIQUID BURNS



TWO MILLION AMERICANS ARE BURNED EACH YEAR

Burns are one of the Major Causes of Accidental Death and Injury to Children

80% of Burns to Children Under 8 Years Old Are Caused by Hot Liquids

Alisa Ann Ruch

BURN FOUNDATION

20944 Sherman Way, Suite 115
Canoga Park, California 91303

(818) 883-7700

GOALS of the Foundation are:

To promote public education in fire and burn prevention.

To support research to improve burn care and treatment.

To provide assistance to burn victims and Burn Centers.

FIRST AID FOR MINOR BURNS

THE SOUTHERN CALIFORNIA BURN CENTER
at Sherman Oaks Community Hospital

4929 Van Nuys Boulevard
Sherman Oaks, California 91403
(818) 981-7111

a service of NU MED

Minor burns are burns that cover only a small area of the body no larger than a few square inches of skin.

DO

- Apply cold water immediately for approximately 15 minutes. This helps lessen the pain and stops the heat from penetrating deeper.
- Leave blisters intact.
- Protect area from heat (sun) and dirt.
- Wash wound gently with a mild soap and water especially if blister bursts.

DO NOT

- Burst the blister; it helps protect the wound.
- Apply butter or grease; this retains heat.

NOTE—CONSULT A DOCTOR FOR:

- Increased pain, redness or fever. These may be a sign of infection.
- Burn to a child less than two years of age.

FOR LARGER OR MORE SERIOUS BURNS, GET MEDICAL ATTENTION IMMEDIATELY.

For further information
or assistance call:

THE SOUTHERN CALIFORNIA BURN CENTER
at Sherman Oaks Community Hospital

4929 Van Nuys Boulevard
Sherman Oaks, California 91403
(818) 981-7111

a service of NU MED

BURN INJURY PREVENTION

THE SOUTHERN CALIFORNIA BURN CENTER
at Sherman Oaks Community Hospital
4929 Van Nuys Boulevard
Sherman Oaks, California 91403
(818) 981-7111

a service of NU MED

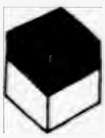
THE SOUTHERN CALIFORNIA BURN CENTER
at Sherman Oaks Community Hospital
4929 Van Nuys Boulevard
Sherman Oaks, California 91403
(818) 981-7111

a service of NU MED

BURN INJURY PREVENTION

1

Keep matches, lighters, flammable liquids and chemicals out of reach, especially a child's.



2

Use safety closures on flammable liquids and chemicals. Store them in locked cabinets.

3

Think of pilot lights and flammable liquids and cleaners as deadly sources of ignition.

4

Empty ashtrays into metal containers.

5

Enclose fireplaces with screens.

6

Be careful around outdoor fires, barbecues and stoves, and, above all, keep children away from them.

7

Replace or repair worn or broken electrical cords.

8

Be sure not to run cords under rugs and make sure cords are not too long.

9

Never hold a baby or child while you are drinking hot liquids.

10

Use flame retardant clothing for children, if possible.

11

Sleep with doors closed, where possible.

12

Arrange a meeting place outside the home, and from time to time have practice fire drills in the home.

13

Keep cooking appliance cords and pot handles away from the flow of traffic and, if possible, cut all appliance cords short so appliance sits way back on stove or counter.

14

Lift pot lids so that steam escapes away from you.

15

Be careful when cooking on stove—clothes, potholders and towels catch fire very easily. Be careful also of hot foods left out on counters.

16

Check water before placing child in bathtub; stay with child while in tub. It's so easy for a little one to turn on the hot water faucet.

Cancer of the Testis

U.S. DEPARTMENT OF
HEALTH AND HUMAN SERVICES
Public Health Service
National Institutes of Health

What You Need To Know About

Cancer of the Testis

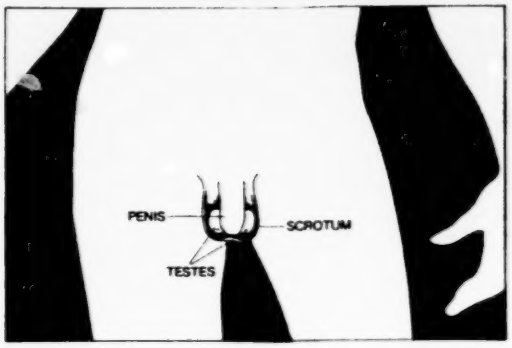
INTRODUCTION

This pamphlet is written for you, the *cancer** patient. It also may be useful for members of your family.

We believe it is important for you and your family to understand your illness so you can face it together, with courage and hope.

Much has been learned about the nature of cancer in recent years. As a result, strides have been made in diagnosing the disease and treating it effectively. These modern methods are described in this pamphlet. You also will find information on sources of assistance, areas of research, and definitions of medical terms.

**Words in italics are explained at the end of the pamphlet.*



CANCER OF THE TESTIS

The testes, or testicles, are the primary male sex organs, which produce spermatozoa, the cells that fertilize the female egg during reproduction. Each of the two testes is called a testis or testicle. The testes are oval shaped organs, suspended below the *penis* in a pouch of skin called the *scrotum*.

Cancer of the testis is, like other cancers, a disease of the body's cells. In the large majority of cases, only one testis is affected. Although testis cells differ in shape and function from cells in other parts of the body (such as the heart, lungs or skin) all cells have a common characteristic—the ability to reproduce themselves by dividing. Normally cells grow in an orderly, controlled pattern. Just enough new cells grow to replace old wornout cells and repair body tissue.

When cell division is not orderly, abnormal growth takes place. Masses of tissue called *tumors* build up. Tumors may be *benign* or *malignant*.

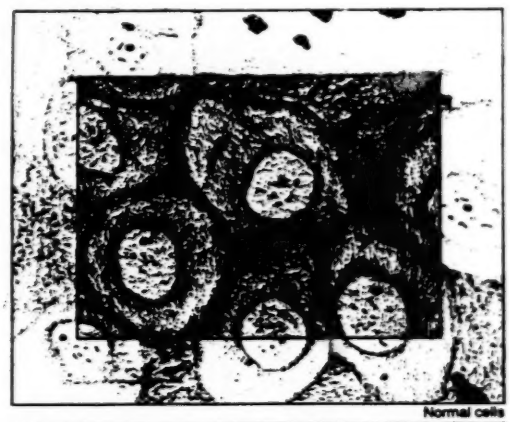
Benign tumors remain localized and usually do not spread or threaten one's life. They can be removed completely by surgery and are not likely to recur.

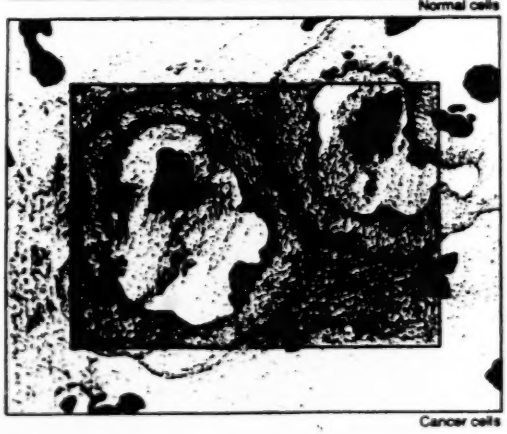
Malignant tumors are cancers. They can invade and destroy nearby tissues and organs or spread to other parts of the body. The new growths they form are called *metastases*. Even if cancer is removed by surgery or *radiation therapy*, the disease sometimes recurs because it may have spread.

SYMPTOMS

A small hard lump, about the size of a pea, in a testicle is the most common symptom of cancer of the testis, or testicular cancer. In the early stages of the disease, the lump is usually painless, giving no warning of the danger.

Other symptoms may include enlargement of a testicle, a heavy feeling


Normal cells


Cancer cells

in a testicle, a sudden accumulation of fluid, or blood in the scrotum. If the disease has spread, there may be swelling or tenderness in other parts of the body, such as the groin, breast or neck. These symptoms may not be due to cancer. But they should be reported promptly to a doctor.

DIAGNOSIS

Most testicular cancers are first discovered by men themselves. When you find a swelling, hard lump or pain in a testicle and bring it to the attention of a physician, he will examine it by palpation with his fingers. If he suspects that it may be cancer he will recommend that it be removed to confirm or rule out the diagnosis of cancer. A sample of tissue from the suspected area is examined under the microscope by a pathologist, a physician who interprets and diagnoses the changes caused by disease in body tissues.

If the diagnosis of cancer is made then additional tests are necessary to determine if the cancer has spread to other regions of the body. In addition to plain x-rays of the chest and abdomen, special procedures such as *intravenous pyelography* and *lymphangiography* may show the spread of tumors that are otherwise not detectable. The total body scanner or "CAT" scan can also be used to check for spread of testicular cancer; this technique produces detailed pictures of cross-sections of the body.

Scientists have recently shown that testicular cancers may produce certain proteins that can be detected in the bloodstream. Two such proteins are called *alpha-fetoprotein* (AFP)

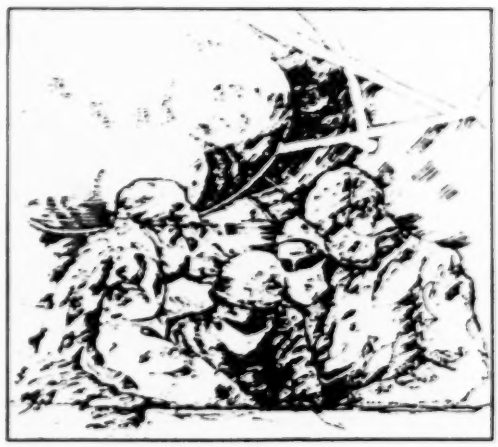
and *human chorionic gonadotropin* (HCG). The measurement of these proteins can be helpful in the diagnosis of testicular cancer, as well as in detecting spread of the disease and following the effectiveness of therapy.

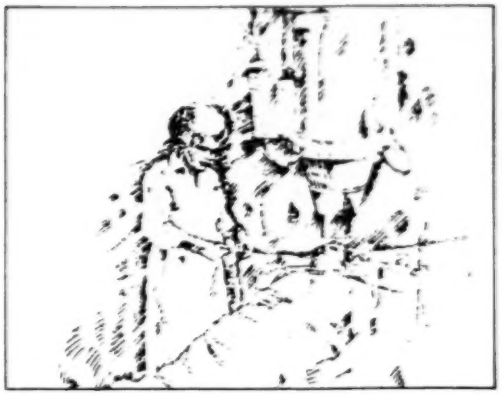
When a diagnosis of cancer of the testis is confirmed, it is best for you to begin treatment in a hospital that has an expert staff and the resources available to apply all forms of effective treatment right from the beginning. You may wish to request a second opinion from another physician to confirm the first diagnosis and recommendations for therapy.

TREATMENT

Your medical history, your general health, the type and location of your cancer or cancers, and many other factors are considered in determining the best treatment for you. The therapy must be tailored to your individual needs.

Treatment of cancer of the testis always includes surgical removal of the affected





testicle. If the disease is localized, that may be the only treatment you may require.

You need have no fear that this will divest you of your "manhood," rendering you sterile or impotent. Just as a person who has had a diseased kidney removed can get along very well with one healthy kidney, one healthy testicle is perfectly ample for full sexual function.

If it is suspected that the cancer may have spread to nearby *lymph nodes* (bean-shaped structures in the lymphatic system, a circulatory network through which cancer cells can travel to other parts of the body), these also will be removed.

Improved surgical techniques have been developed to reduce the bulk of large tumors that were formerly inoperable and too big to be treated by other means. Most of the tumor can be removed by surgery and the remaining cancer eliminated by drugs or radiation.

In recent years, advances in surgical techniques and medical care have made extensive surgery possible for persons previously considered too old or infirm for this treatment. Today surgeons have the help of highly competent teams of nurses, therapists, technicians and other professionals to support patients

throughout their post-operative period.

Following surgery, you may be treated with radiation therapy, chemotherapy, or a combination of both.

The basic principle of *radiation therapy* is to focus the beam of radiation on the cancer at doses that will destroy the cancer with minimal damage to surrounding normal tissue. Radiation therapy uses X-rays, cobalt or other sources of ionizing radiation for destruction of the cancer.

If you have widely spread testicular cancer, *chemotherapy* (treatment with anticancer drugs) is chosen. Anticancer drugs kill cancer cells. Because the drugs can act on normal cells as well as cancerous ones, your physician must maintain a delicate balance of enough drugs to kill cancer cells without destroying too many healthy cells. For peak effectiveness of treatment and to minimize undesirable side-effects, the drugs are used in various combinations.

Some anticancer drugs may make you feel sick for a while, but your doctor tries to work out a treatment schedule that disrupts your daily routine as little as possible. The length and frequency of chemotherapy depend on a number of factors. These include your type of cancer, the type of anticancer drugs prescribed,

how long it takes you to respond to these drugs, and how well you tolerate side-effects of the drugs. Most chemotherapy programs are carried out in the outpatient department of a hospital. For some patients, however, short periods of hospitalization are necessary in order to monitor the drug treatment very closely.

Both chemotherapy and radiation therapy may be used at different times or in combination to destroy cancer cells or to relieve pain.

REHABILITATION AND OTHER SERVICES

After treatment you should continue to have medical examinations regularly so that your doctor can check your progress. If *rehabilitation* is needed, your doctor will make recommendations to you. Staff at your hospital and other community organizations are ready to give you many kinds of help.

The social service department of the hospital can advise you about local organizations that offer help for cancer patients and their families. Many organizations provide services that may include financial aid, transportation to and from the hospital for medical care, person-to-person assistance through group meetings, as well as other services.

By looking through your telephone directory you may find listings of social service agencies that can be of assistance. Also, by dialing the 800-information operator (800-555-1212 or 1-800-555-1212) and asking for the toll-free number for "Cancer Information," you can get in touch with an office that can answer questions you may wish to ask about cancer or resources in your area.

In addition, the Cancer Information Service is a toll-free telephone inquiry system which supplies information about cancer and cancer-related resources to cancer patients, their families, and health professionals. Cancer Information Service offices are based in major cancer programs around the country.

For information on other cancer-related subjects, call the toll-free number of the Cancer Information Service for your state listed below. For quantities of this and other cancer publications, write to the Office of Cancer Communications, National Cancer Institute, Bethesda, Maryland 20205

ALABAMA: 1-800-292-6201
ALASKA: 1-800-638-6070
CALIFORNIA:
From Area Codes (213), (714), and (805), 1-800-252-9066
CONNECTICUT: 1-800-922-0824
DELAWARE: 1-800-523-3586
DISTRICT OF COLUMBIA:
(Includes suburban Maryland and Northern Virginia)
(202) 636-5700
FLORIDA: 1-800-432-5953
GEORGIA: 1-800-327-7332
HAWAII:
Oahu: 524-1234
Neighbor Islands: Enterprize 6702
ILLINOIS: 800-972-0586
KENTUCKY: 800-432-9321
MAINE: 1-800-225-7034
MARYLAND: 800-429-1444
MASSACHUSETTS: 1-800-952-7420
MINNESOTA: 1-800-582-5262
NEW HAMPSHIRE: 1-800-225-7034
NEW JERSEY:
(Northern) 800-523-3586
NEW JERSEY:
(Southern) 800-523-3586
NEW YORK STATE: 1-800-462-7255
NEW YORK CITY: (212) 794-7982
NORTH CAROLINA: 1-800-672-0943
NORTH DAKOTA: 1-800-328-5188

OHIO: 1-800-282-6522
PENNSYLVANIA: 1-800-822-3963
SOUTH DAKOTA: 1-800-328-5188
TEXAS: 1-800-392-2040
VERMONT: 1-800-225-7034
WASHINGTON: 1-800-552-7212
WISCONSIN: 1-800-362-8038

ALL OTHER AREAS: 800-638-6694

EMOTIONAL ASPECTS

You may feel many different emotional reactions from the time cancer is diagnosed. "Why me?" is a question repeated over and over. This is a normal reaction to the diagnosis of cancer. You also may have periods of anxiety or depression. You may need to go through these feelings before you can accept the diagnosis and learn to live with it.

Talking with your doctor, other health professionals, your family, and even other cancer patients can give you emotional support during and after treatment. Because your doctor knows your condition, he is in the best position to answer questions about your individual case. Making a list of questions before you see the doctor can help you remember to ask him everything you want to know. You may be assured that your doctor and other health professionals will continue to offer you the best care that medicine has to offer.

You and your family may be able to handle the emotional strain of cancer better by discussing your problems openly with each other and with your doctor. But you may need help. You should feel free to ask for counseling if your problems become too difficult to handle.

QUESTIONS YOU MAY WANT TO ASK YOUR DOCTOR

You or your family may find it difficult to know how to ask your doctor some of the questions you may have about cancer. This is understandable. Cancer and its treatment are complex. Even your doctor may not always be able to give definite answers. But he or she will be happy to discuss your questions with you. Some typical questions might include these:

- ☐ Is the tumor benign or malignant?
- ☐ If it is benign, can it be cured?
- ☐ If it is cancer, what kind do I have?
- ☐ If it is cancer, has it spread?
- ☐ Can you predict how successful an operation or radiation treatment would be?
- ☐ What are the risks?
- ☐ Should I get an opinion from another doctor?
- ☐ If an operation is done, will I need other treatment?
- ☐ How helpful will this be in resuming normal activities afterward?
- ☐ If I take anticancer drugs, what will the side-effects be?
- ☐ How often will I need medical checkups?

- ☐ What should I tell my relatives and friends?

SELF-EXAMINATION

Although cancer of the testis rarely spreads to the other testicle, the possibility exists and you should be on guard against the risk. The best means for early detection of the disorder is self-examination of the testes (or testis, if one has been removed.)

The technique is ideally performed after a warm bath or shower when the scrotal skin is most relaxed and the contents can more easily be felt. Each testicle should be examined with the fingers of both hands gently probing the soft flesh. If any hard lumps are found, they may not be cancer but they should be brought promptly to the attention of a physician.

Fortunately, testicular cancer can be one of the most curable of all forms of cancer. If recurring cancer should necessitate the removal of the second testicle, the man will not be able to father any more children but his sexual potency can be maintained by hormone injections. All his other functions will remain relatively normal.

RESEARCH

The National Cancer Institute, a bureau in the U.S. Department of Health, and Human Services, is the Federal Government's principal agency for cancer research. The Institute supports research in many of the nation's universities, medical centers and laboratories, and conducts research in its own laboratories and clinics.

When laboratory research suggests that a new treatment may be more effective than standard methods, Cancer Clinical

Cooperative Groups supported by the Institute conduct studies to evaluate the treatment in cancer patients. These new approaches may include anticancer drugs, radiation therapy, surgery, and *immunotherapy,* alone or in various combinations. Many hospitals and medical centers around the country are participating in Cooperative Group studies.

In addition to laboratory and clinical research, the National Cancer Institute studies patterns of cancer occurrence in the population. These studies show that cancer of the testis, unlike most other cancers which occur in later years, occurs more frequently in young men between the ages of 20 to 40, the prime of life. Although testicular cancer is rare under any circumstances, it occurs relatively more often among men who have "undescended" testes. In the male fetus, the testes are formed in the abdominal cavity and shortly after birth, in normal

development, descend to the scrotum. If they never make this descent or descend after the age of six, the chances of the development of testicular cancer in later years are increased.

These studies suggest that, in prevention of the disorder, parents can make sure that male infants are medically checked for descent of the testes to their proper place. If an abnormality is found during early childhood, it can easily be remedied.

Research has also shown that cancer of the testis, like all forms of cancer, is not contagious. No one can catch cancer from another person. Cancer is not transmitted by coughing or sneezing, nor by sexual intercourse or any other kind of physical contact.

Although the causes of cancer of the testis, like those of most cancers, remain unknown, new research findings may suggest ways of preventing cancer. At the same time, the trend toward improved diagnosis and treatment provides hope that more patients with this disease will be treated effectively.

DEFINITIONS

ALPHA-FETOPROTEIN (AFP)	*A substance made of protein and normally found in the blood in large amounts during development of the fetus before birth. The substance virtually disappears after an individual is 1 year of age. It can reappear as a product of certain cancers, primarily liver cancer and testicular cancer that starts in germ cells of the testis.*
BENIGN TUMOR	*Not cancer. A noncancerous growth that does not spread to other parts of the body. Recovery is favorable with treatment.*
BIOPSY	*The removal and microscopic examination of tissue from the living body for purposes of diagnosis.*
CANCER	*A general term for more than 100 diseases characterized by abnormal and uncontrolled growth of cells. The resulting mass, or tumor, can invade and destroy surrounding normal tissues. Cancer cells from the tumor can spread through the blood or lymph (the clear fluid that bathes body cells) to start new cancers in other parts of the body.*
CAT SCAN	*A newly developed X-ray technique that gives a detailed picture of a cross-*

	section of the body. Also called computerized axial tomography.
CHEMO-THERAPY	*Treatment with anticancer drugs.*
HUMAN CHORIONIC GONADOTROPIN (HCG)	*A protein substance that is normally produced by the Placenta during pregnancy, but is also produced by certain cancers that are similar to the cells of the placenta, such as testicular germ cell cancers.*
IMMUNO-THERAPY	*Treatment by stimulation of the body's immune defense system. Doctors are doing research on immunotherapy as a possible treatment for cancer.*
INTRAVENOUS PYELOGRAPHY (IVP)	*X-ray studies of the kidneys and urinary system. The structures of these organs are made visible by injection of a dye that blocks X-rays and is concentrated in the urine.*
LYMPHANGI-OGRAPHY	*X-ray studies of lymph nodes and lymph vessels made visible by the injection of a dye that blocks X-rays.*
LYMPH NODES	*Bean-shaped structures scattered along vessels of the lymphatic system. The nodes act as filters, collecting bacteria or cancer cells that may travel through the lymph system.*
MALIGNANT TUMORS	*Cancerous. A growth of cancer cells (see definition of* CANCER

METASTASIS	*The spread of cancer from one part of the body to another. Cells in the new cancer are like those in the original cancer.*
METASTASES	*Cancer growths that started from cancer cells from another part of the body.*
PENIS	*Male sex organ.*
RADIATION THERAPY	*Treatment using high-energy radiation from X-ray machines, cobalt, radium, or other sources.*
REHABILITA-TION	*Restoration of a patient to the best possible physical and mental health and well-being through treatment and training.*
SCROTUM	*The pouch of skin which contains the testicles.*
TUMOR	*An abnormal mass of tissue.*
X-RAYS	*High-energy radiation used in high doses to treat cancer, or in low doses to diagnose the disease.*

WHAT YOU NEED TO KNOW ABOUT

Cancer of the Brain and Spinal Cord

National Cancer Institute

NIH Publication No. 81-1558
Reprinted November 1980

U.S. DEPARTMENT OF HEALTH
AND HUMAN SERVICES
Public Health Service
National Institutes of Health

What You Need To Know About

Cancers of the Brain and Spinal Cord

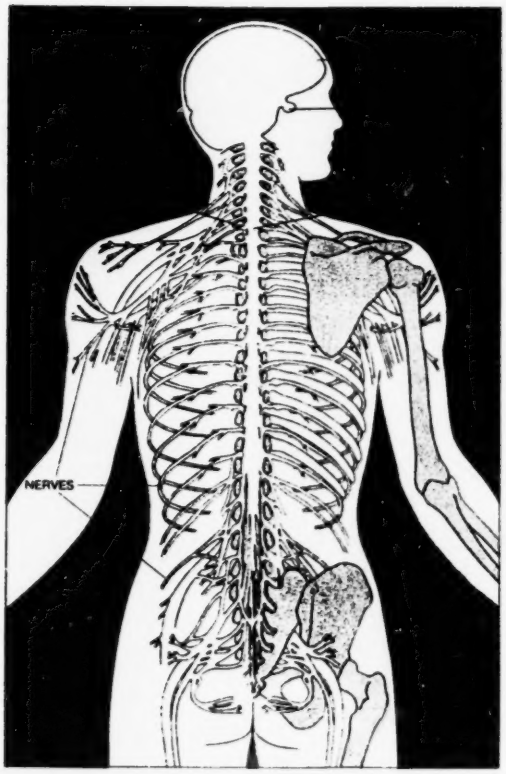
INTRODUCTION

This pamphlet is written for you, the *cancer** patient. It also may be useful for members of your family.

We believe it is important for you and your family to understand your illness so you can face it together, with courage and hope.

Much has been learned about the nature of cancer in recent years. Modern methods of diagnosing and treating cancers of the brain and spinal cord are described in this pamphlet. You also will find information on sources of assistance, areas of research, and definitions of medical terms.

** Words in italics are explained at the end of the pamphlet.*



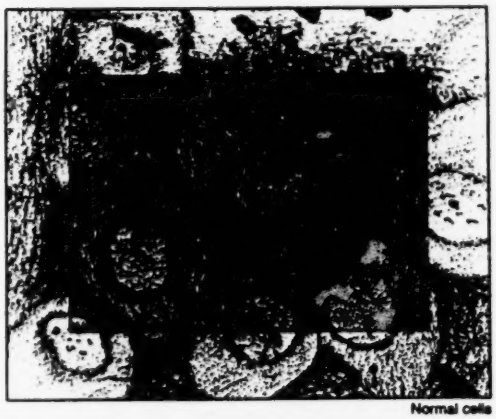
BRAIN AND SPINAL CORD CANCERS

The brain and spinal cord are composed of nerve tissue that receives and transmits messages along the nerves of the body. The brain and spinal cord together form the body's central nervous system.

The brain is enclosed within the hard casing of the *skull,* but its nerve tissue is continuous with the spinal cord through an opening in the skull's base. The spinal cord extends a little more than halfway down the back, within the spinal column (backbone). The spinal cord is about as big around as the little finger. (See illustration).

Cancers of the brain and spinal cord, like other cancers, are diseases of the body's cells. Cells are tiny structures that make up all parts of the body: the brain, spinal cord, skin, heart, lungs, bones and so forth. Although cells of various organs differ in shape and function, all cells reproduce themselves by dividing. Normal growth and repair of tissue take place in this orderly manner.

When cell division is not orderly and controlled, abnormal growth occurs. Masses of tissue called tumors build up. Tumors may be *benign* or *malignant.* A malignant tumor is cancer.



Normal cells

Cancer cells

Malignant tumors, or cancers, invade and destroy surrounding normal tissue. If cancer cells break away from a malignant tumor, they can travel through the blood or lymph (the clear fluid that bathes body cells) to start new cancers in other locations. The spread of cancer from one part of the body to another is called metastasis.

Cancers that begin in the brain or spinal cord seldom spread (metastasize) to other locations. But metastasis to the brain from cancers of other body sites is common.

Unlike cancers, benign tumors do not spread to surrounding tissue or other parts of the body. But they may press against normal tissue as they get larger, and thus interfere with body functions.

SYMPTOMS OF BRAIN CANCER

Brain cancer symptoms are varied and depend upon what part of the brain is involved. Any of the symptoms may be caused by a condition other than cancer.

Headaches are the most common symptom. They may indicate a growing tumor's increasing pressure on normal brain tissue. Any new severe or persistent headache should be reported promptly to a doctor.

Other symptoms may be increasing irritability, a feeling of laziness or unusual sleepiness. Sometimes, when a tumor develops slowly, the symptoms appear so gradually that they are scarcely noticed.

When a tumor grows quickly, symptoms tend to be more disturbing. Depending on the location and size of the tumor, symptoms may include nausea, vomiting, disturbance or loss of hearing, sight, speech, taste, smell or balance; or any change in control of movement.

Seizures occur in about one-third of brain cancer cases.

DIAGNOSIS OF BRAIN CANCER

Diagnosis by a doctor starts with questions about symptoms, followed by an examination for physical signs that may point to a tumor. Examination of the eye with an instrument called an *ophthalmoscope* lets the doctor see the retina (the sensory membrane that lines the eye) and the *optic nerve,* which connects the retina with the brain. A tumor pressing anywhere along the route of this nerve swells it, causing a visible condition called *papilledema.* The doctor may also check your muscle function, reflexes and ability to feel pin pricks.

A number of specific examinations to detect brain tumors are now available. The appropriate type of test will be selected by your doctor. Some of them are:

- Skull *X-ray.* This examination can reveal effects that a tumor might have on the bone of the skull. It can also show tiny calcifications (deposits of calcium) in the brain that may indicate the presence of a tumor.
- Computerized Axial Tomography. This is a new, painless and excellent diagnostic technique. A computer connected to a rotating X-ray machine produces a picture of the head with more detail than a standard X-ray film. The picture is produced from a series of cross-sectional X-rays taken in a circle around the head. The method is often called a "CAT scan", an abbreviation of Computerized Axial Tomography scan.
- Electroencephalography, sometimes called EEG. The brain's electrical activity is recorded on a machine by means of electrodes placed at various

locations on the head. The patient does not feel anything from the machine.

- Brain Scan. One type of brain scan is the CAT scan mentioned above. In another method, the physician injects a small, harmless amount of *radioactive* chemical into the bloodstream. The chemical will concentrate in most brain tumors. A scanning device passed over the head senses any areas of radioactivity. A connecting machine prints out a picture revealing the location and size of a tumor, if one is there.
- Angiography. A tumor may change the appearance of the *arteries* that carry blood to the brain. In the examinatiin by angiography, also called cerebral arteriography, an X-ray picture of the arteries is taken after a dye is injected into the bloodstream to make the arteries visible. An *anesthetic* is administered before this examination so that it will not be painful.
- Pneumoencephalography. An X-ray picture of the brain is taken after air or gas is injected into the space around the segments of the brain. The examination may also be called ventriculography.
- Echoencephalography. A picture of the brain is produced on a television screen by "echoes" of ultrasound, sound waves above the normal hearing range. A technician passes an instrument that looks like a small microphone back and forth over the head. The instrument emits sound waves that strike the brain and bounce back against the instrument. An electrical connection between the microphone-like instrument and the screen transmits and records a picture of the brain. Echoencephalography is painless and soundless.

The doctor recognizes distinctive characteristics of cancer that determine

whether microscopic examination of a specimen of tissue from the suspected area should be made. The surgical removal of a small sample of tissue for examination is called a biopsy. This may also be performed at the time the tumor is surgically removed. The sample is studied under a microscope by a pathologist, a physician who interprets and diagnoses the changes caused by disease in the body tissues. The biopsy is the only certain way to know whether a tumor is cancerous or benign.

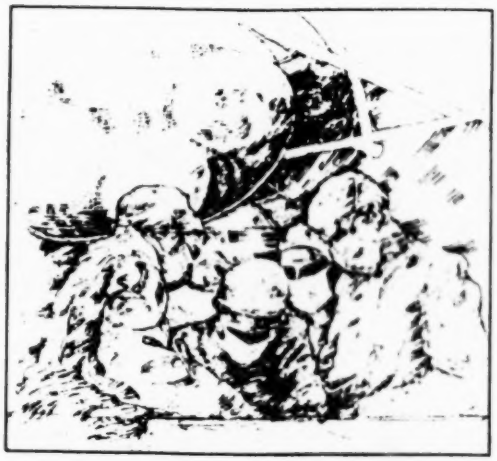
If a diagnosis of cancer is made by the doctor, it is best for you to begin treatment in a hospital that has an expert staff and resources to apply all forms of effective treatment right from the beginning. Before treatment you may, if you wish, request a second opinion from another physician to confirm the diagnosis and recommendations for therapy.

TREATMENT OF BRAIN CANCER

Your doctor will consider a number of factors in determining the best treatment for you. Among these are your medical history, your general health, and the type and location of the tumor you have. Benign or cancerous brain tumors may be treated by surgery, radiation or anticancer drugs. These methods are often used in combination. Your treatment must be tailored to your individual needs.

Surgery is the oldest method of treating brain tumors. Steady advances have been made since modern techniques were introduced in the 1930's.

A brain surgeon (neurosurgeon) may be able to completely remove a benign tumor or a cancer that is encapsulated (enclosed in a membrane or sac). If the cancer cannot be removed completely, the



surgeon may be able to remove a part and thus relieve the pressure that the growing tumor is causing within the skull.

Surgery, whether complete or partial, frequently improves a patient's condition, and often restores a seriously ill patient to active life.

Radiation therapy is used to kill benign or cancerous brain tumor cells that cannot be removed completely by surgery. The basic principle of radiation therapy is to focus the beam of radiation on the tumor at doses that will destroy it without damaging surrounding normal tissue. Radiation therapy uses X-rays, cobalt, or other sources of ionizing radiation for destruction of the tumor.

Chemotherapy (treatment with anticancer drugs) is the most recent approach to treatment of brain cancers. Anticancer drugs for brain cancers may be administered by mouth, intravenously (into a vein), or by injection into the spinal column. Anticancer drugs also can be fed directly into the brain through a small, implanted tube. The route depends upon the tumor and its location, as well as the drug being used.

Drugs administered intravenously and by mouth reach the brain through the

bloodstream. Nutrients and other materials pass through the walls of blood vessels into the brain, but some anticancer drugs cannot get through. This "blood-brain barrier" explains why some anticancer drugs have been less effective against brain cancers than other cancers.

Certain drugs are able to penetrate the "blood-brain barrier." A new group of anticancer drugs called *nitrosoureas* has been especially effective in reaching brain cancers.

Anticancer drugs kill cancer cells. Because the drugs also act on normal cells, the doctor plans the doses carefully in order to kill cancer cells without destroying too many healthy cells. Some drugs may make you feel sick for a while, but the doctor tries to work out a treatment schedule that disrupts your daily routine as little as possible. The length and frequency of chemotherapy depend upon a number of factors. These include your type of cancer, the kind of anticancer drugs prescribed, the length of time it takes for you to respond to the treatment, and how well you tolerate any side-effects.

Both chemotherapy and radiotherapy may be used at different times with or instead of surgery. Sometimes different kinds of treatment are combined to destroy cancer cells or to relieve pain.

SPINAL CORD CANCERS

Spinal cord cancers are similar to brain cancers because the spinal cord and brain contain similar types of tissue from which the tumors grow. However, tumors develop less often in the spinal cord than in the brain. Most cancers found in the spinal cord have spread from other parts of the body.

When spinal cord tumors develop, they may stop the flow of messages along the nerves between brain and body, in much the same way accidental injury to the spinal cord does.

Pain is a common symptom, due to pressure on the spinal cord within the backbone. Loss of feeling and ability to move the arms and legs may follow, sometimes with *paralysis* on one side of the body and loss of sensation on the other.

Careful physical examination and X-rays of the affected spinal areas are required for diagnosis of spinal tumors.

Examination of fluid taken from the spine may be necessary to confirm the finding.

Prompt treatment may prevent or lessen the effects of spinal cord tumors. Surgery is the usual method of treatment. Radiation therapy and anticancer drugs may be used along with surgery.

REHABILITATION AND OTHER SERVICES

After treatment you should continue to have medical examinations regularly so that your doctor can check your progress. If rehabilitation is needed, your doctor will make recommendations to you. Staff at your hospital and other community organizations are ready to give you many kinds of help.

The social service department of the hospital can advise you about local organizations that offer help for cancer patients and their families. Many organizations provide services that may include financial aid, transportation to and from the hospital for medical care, person-to-person assistance through group meetings, as well as other services.

In addition, the Cancer Information Service is a toll-free telephone inquiry system which supplies information about cancer and cancer-related resources to cancer patients, their families, and health professionals. Cancer Information Service offices are based in major cancer programs around the country.

For information on other cancer-related subjects, call the toll-free number of the Cancer Information Service for your state listed below. For quantities of this and other cancer publications, write to the Office of Cancer Communications, National Cancer Institute, Bethesda, Maryland 20205

ALABAMA: 1-800-292-6201
ALASKA: 1-800-638-6070
CALIFORNIA:
From Area Codes (213), (714), and (805), 1-800-252-9066
CONNECTICUT: 1-800-922-0824
DELAWARE: 1-800-523-3586
DISTRICT OF COLUMBIA:
(Includes suburban Maryland and Northern Virginia)
(202) 636-5700
FLORIDA: 1-800-432-5953
GEORGIA: 1-800-327-7332
HAWAII:
Oahu: 524-1234
Neighbor Islands: Enterprize 6702
ILLINOIS: 800-972-0586
KENTUCKY: 800-432-9321
MAINE: 1-800-225-7034
MARYLAND: 800-429-1444
MASSACHUSETTS: 1-800-952-7420
MINNESOTA: 1-800-582-5262
NEW HAMPSHIRE: 1-800-225-7034
NEW JERSEY:
(Northern) 800-523-3586
NEW JERSEY:
(Southern) 800-523-3586
NEW YORK STATE: 1-800-462-7255
NEW YORK CITY: (212) 794-7982
NORTH CAROLINA: 1-800-672-0943
NORTH DAKOTA: 1-800-328-5188
OHIO: 1-800-282-6522
PENNSYLVANIA: 1-800-822-3963
SOUTH DAKOTA: 1-800-328-5188
TEXAS: 1-800-392-2040
VERMONT: 1-800-225-7034
WASHINGTON: 1-800-552-7212
WISCONSIN: 1-800-362-8038

ALL OTHER AREAS: 800-638-6694

EMOTIONAL ASPECTS

You may feel many different emotional reactions from the time cancer is diagnosed. "Why me?" is a question every patient asks. This is a normal reaction to the diagnosis of cancer. You also may have periods of anxiety or depression. You may need to go through these feelings before you can accept the diagnosis and learn to live with it.

Talking with your doctor, other health professionals, your family, and even other cancer patients can give you emotional support during and after treatment. Because your doctor knows your condition, he is in the best position to answer questions about your individual case. Making a list of questions before you see the doctor can help you remember to ask him everything you want to know. You may be assured that your doctor and other health professionals will continue to offer you the best care that medicine has to offer.

You and your family may be able to handle the emotional strain of cancer better by discussing your problems openly with each other and with your doctor. But you may need help. You should feel free to ask for counseling if your problems become too difficult to handle.

QUESTIONS YOU MAY WANT TO ASK YOUR DOCTOR

You or your family may find it difficult to know how to ask your doctor some of the questions you may have about cancer. This is understandable. Cancer and its treatment are complex. Even your doctor may not always be able to give definite answers. But he or she will be happy to discuss your questions with you. Some typical questions might include these:

- ☐ Is the tumor benign or malignant?
- ☐ If it is benign, has it been cured?
- ☐ If it is cancer, what kind do I have?
- ☐ If it is cancer, has it spread?
- ☐ Can you predict how successful an operation or radiation treatment would be?
- ☐ What are the risks?
- ☐ Should I get an opinion from another doctor?
- ☐ If an operation is done, will I need other treatment?
- ☐ How helpful will this be in resuming normal activities afterward?
- ☐ If I take anticancer drugs, what will the side-effects be?
- ☐ How often will I need medical checkups?
- ☐ What should I tell my relatives and friends?

RESEARCH

The National Cancer Institute, a bureau in the U.S. Department of Health, Education, and Welfare, is the Federal Government's principal agency for cancer research. The Institute supports research in many of the nation's universities, medical centers and laboratories, and

conducts research in its own laboratories and clinics.

When laboratory research suggests that a new treatment may be more effective than standard methods, Cancer Clinical Cooperative Groups supported by the Institute conduct studies to evaluate the treatment in cancer patients. These new approaches may include anticancer drugs, radiation therapy, and surgery, alone or in various combinations. Many hospitals and medical centers around the country are participating in Cooperative Group studies.

The National Cancer Institute also studies patterns of cancer occurrence in the population. These studies show that cancers of the brain and spinal cord are among the less common forms of cancer. New cases are diagnosed in about 11,000 Americans each year, representing about 1.5 percent of all new cases of cancer.

Although relatively few children develop cancer of any kind, cancers of the brain and spinal cord rank after leukemia as a major proportion of the cancers that do occur in children.

In the United States, cancer of the brain occurs more often in males than in females, and more often in whites than in blacks. Cancer of the spinal cord occurs about equally in both sexes and races.

Research also has shown that these cancers, like all forms of cancer, are not contagious. No one can catch cancer from another person. Cancer is not transmitted by coughing or sneezing, nor by sexual intercourse or any other kind of physical contact.

Although the causes of brain and spinal cord cancers remain unknown, new research findings may suggest ways of preventing these diseases. At the same time, the trend toward improved diagnosis and treatment provide hope that more patients with these cancers will be treated effectively.

DEFINITIONS

ANESTHETIC	*A substance that causes loss of sensation or feeling in a part or all of the body.*
ARTERIES	*Vessels that carry blood from the heart through the body.*
BENIGN TUMOR	*Not cancer. A noncancerous growth that does not invade surrounding tissue or spread to other locations. Recovery is favorable with treatment.*
CANCER	*A general term for more than 100 diseases characterized by abnormal and uncontrolled growth of cells. The resulting mass, or tumor, can invade and destroy surrounding normal tissues. Cancer cells from the tumor can spread to start new cancers in other locations in the body.*
CHEMO-THERAPY	*Treatment with anticancer drugs.*
ELECTRODES	*Small devices containing wires that conduct electrical waves from the brain to a machine that records them.*
MALIGNANT TUMOR	*Cancerous. A growth of cancer cells (See definition of CANCER).*
NITRO-SOUREAS	*A class of chemical compounds that can enter the brain through the walls of blood vessels in the brain. The anticancer drugs BCNU, CCNU and methyl-CCNU are nitrosoureas.*

OPHTHALMOSCOPE	*A lighted instrument used in eye examinations. It enables a doctor to look through the pupil (the hole in the center of the color part of the eye) and see the retina and optic nerve.*
OPTIC NERVE	*The nerve that conducts visual stimuli from the retina to the brain.*
PAPILLEDEMA	*A swelling in part or all of the optic nerve.*
PARALYSIS	*Loss of ability to move.*
RADIATION THERAPY	*Treatment using high-energy radiation from X-ray machines, cobalt, radium, or other sources.*
RADIOACTIVE	*The property possessed by some chemicals of spontaneously emitting radiation.*
RETINA	*The sensory membrane that lines the eye and receives the image formed by the lens of the eye. The retina is the instrument of vision. It is connected with the brain by the optic nerve.*
SEIZURES	*Convulsions; sudden violent disturbances characterized by involuntary contractions of the muscles.*
SKULL	*The skeleton of the head that encloses and protects the brain and chief sense organs. The skull also supports the jaws.*

SURGERY FOR CANCER	*An operation performed by a surgeon to remove cancerous tissue from the body.*
X-RAYS	*High-energy radiation used in high doses to treat cancer or in low doses to diagnose the disease.*

ERIC Clearinghouse for
Junior Colleges
APR 3 1987